

ABSTRACT OF THE DISCLOSURE

A method and a processing tool are provided for forming a metal layer with improved morphology on a substrate. The method includes pre-treating the substrate by exposing the substrate to excited species in a plasma, exposing the pre-treated substrate to a process gas containing a metal-carbonyl precursor, and forming a metal layer on the pre-treated substrate surface by a chemical vapor deposition process. The metal-carbonyl precursor can contain $\text{W}(\text{CO})_6$, $\text{Ni}(\text{CO})_4$, $\text{Mo}(\text{CO})_6$, $\text{Co}_2(\text{CO})_8$, $\text{Rh}_4(\text{CO})_{12}$, $\text{Re}_2(\text{CO})_{10}$, $\text{Cr}(\text{CO})_6$, or $\text{Ru}_3(\text{CO})_{12}$ or any combination thereof, and the metal layer can contain W, Ni, Mo, Co, Rh, Re, Cr, or Ru, or any combination thereof, respectively.